

Please amend the claims as follows (this listing replaces all prior versions):

1-35. (Canceled)

36. (Withdrawn) An apparatus comprising:

an element to change a volume of a fluid chamber of a droplet ejection device, the element having an electrical capacitance; and

control circuitry to apply charging voltages using selected charging resistors to charge the electrical capacitance at a first rate, followed by charging the capacitance at a second rate before discharging the capacitance.

37. (Withdrawn) The apparatus of claim 36 wherein the element comprises an electrically actuated displacement device.

38. (Withdrawn) The apparatus of claim 36 wherein different charging voltages are applied to different charging resistors.

39. (Withdrawn) The apparatus of claim 36 wherein the control circuitry comprises charging control switches each associated with one of the charging resistors, each charging control switch determining the connection state between the electrical capacitance and the respective charging voltage through the respective charging resistor.

40. (Withdrawn) The apparatus of claim 36 wherein the control circuitry is to hold a charge in the capacitance for a period of time after charging at the first rate and before charging at the second rate.

41. (Withdrawn) The apparatus of claim 36 wherein the electrically actuated displacement device comprises a piezoelectric actuator.

42. (Withdrawn) An apparatus comprising:  
an element to change a volume of a fluid chamber of a droplet ejection device, the element having an electrical capacitance; and  
control circuitry to apply discharging voltages using selected discharging resistors to discharge the electrical capacitance at a first rate, followed by discharging the capacitance at a second rate before charging the capacitance.

43. (Withdrawn) The apparatus of claim 41 wherein different discharging voltages are applied to different discharging resistors.

44. (Withdrawn) The apparatus of claim 41 wherein the control circuitry comprises discharging control switches each associated with one of the discharging resistors, each discharging control switch determining the connection state between the electrical capacitance and the respective discharging voltage through the respective discharging resistor.

45. (Withdrawn) The apparatus of claim 41 wherein the control circuitry is to hold a charge in the capacitance for a period of time after discharging at the first rate and before discharging at the second rate.

46. (Withdrawn) The apparatus of claim 41 wherein the discharging voltages comprise ground voltage.

47. (Withdrawn) An apparatus comprising:  
an electrically actuated displacement element to change a volume of a fluid chamber of a droplet ejection device, the element having an electrical capacitance; and

circuitry to selectively cause a constant current signal to charge the capacitance.

48. (Withdrawn) The apparatus of claim 46 wherein the circuitry comprises a control switch to control whether the constant current signal is connected to or disconnected from the electrically actuated displacement element, the constant current signal charging the capacitance of the electrically actuated displacement device when the control switch connects the constant current signal to the electrically actuated displacement device.

49. (Withdrawn) An apparatus comprising:  
droplet ejection devices each comprising an element to change a volume of a fluid chamber of one of the droplet ejection devices, the element having an electrical capacitance; and  
circuitry to inject noise into images being printed to reduce banding by providing charges on respective elements.

50. (Withdrawn) The apparatus of claim 48 wherein the element comprises an electrically actuated displacement device.

51. (Withdrawn) The apparatus of claim 48 wherein the circuitry comprises charging control switches to connect or disconnect charge voltages or charge currents to respective elements to charge the respective electrical capacitances.

52. (Withdrawn) The apparatus of claim 48 wherein the circuitry injects noise into images being printed to break up possible print patterns.

53. (Previously Presented) An apparatus comprising:  
droplet ejection devices each comprising an element to change a volume of a fluid chamber of one of the droplet ejection devices, the element having an electrical capacitance, each droplet ejection device being associated with a plurality of charging resistors; and

control circuitry to effect uniform velocities of droplets ejected from at least two different ones of the droplet ejection devices by providing respective charge voltages or charge currents to the volume changing elements to individually control a charge on each volume changing element;

wherein for each droplet ejection device, the control circuitry provides the respective charge voltage or charge current by selecting a first charging resistor associated with the droplet ejection device to charge the electrical capacitance at a first rate followed by selecting a second charging resistor associated with the droplet ejection device to charge the electrical capacitance at a second rate before discharging the electrical capacitance.

54. (Previously Presented) The apparatus of claim 52 wherein the control circuitry effects uniform droplet velocities also by providing respective discharge voltages or discharge currents to the volume changing elements.

55. (Previously Presented) The apparatus of claim 53 wherein the control circuitry comprises discharging control switches to connect or disconnect discharge voltages or discharge currents to respective elements to discharge the respective electrical capacitances.

56. (Previously Presented) The apparatus of claim 52 wherein the control circuitry comprises charging control switches to connect or disconnect charge voltages or charge currents to respective elements through respective charging resistors to charge the respective electrical capacitances.

57. (Previously Presented) The apparatus of claim 52 wherein the volume changing element comprises an electrically actuated displacement device.

58. (Withdrawn) An apparatus comprising:

droplet ejection devices each comprising an element to change a volume of a fluid chamber of one of the droplet ejection devices, the element having an electrical capacitance; and control circuitry to effect predetermined different drop velocities from different droplet ejection devices so as to provide gray scale control by providing respective charge voltages or charge currents to the volume changing elements.

59. (Withdrawn) The apparatus of claim 57 wherein the control circuitry effects predetermined different drop velocities from different droplet ejection devices also by providing respective discharge voltages or discharge currents to the volume changing elements.

60. (Withdrawn) The apparatus of claim 58 wherein the control circuitry comprises discharging control switches to connect or disconnect discharge voltages or discharge currents to respective elements to discharge the respective electrical capacitances.

61. (Withdrawn) The apparatus of claim 57 wherein the control circuitry comprises charging control switches to connect or disconnect charge voltages or charge currents to respective elements to charge the respective electrical capacitances.

62. (Withdrawn) The apparatus of claim 57 wherein the volume changing element comprises an electrically actuated displacement device.

63. (Withdrawn) An apparatus comprising:  
a droplet ejection device comprising an element to change a volume of a fluid chamber of the droplet ejection device, the element having an electrical capacitance; and  
control circuitry to vary the amplitude of charge as well as the length of time of charge on the volume changing element for the first droplet out of the droplet ejection device so as to match subsequent droplets by providing respective charge voltages, charge currents, discharge voltages, or discharge currents to the volume changing element.

64. (Withdrawn) The apparatus of claim 62 wherein the volume changing element comprises an electrically actuated displacement device.

65. (Withdrawn) The apparatus of claim 62 wherein the control circuitry comprises charging control switches to connect or disconnect the charge voltages or charge currents to the element to charge the electrical capacitance.

66. (Withdrawn) The apparatus of claim 62 wherein the control circuitry comprises discharging control switches to connect or disconnect the discharge voltages or discharge currents to the element to discharge the electrical capacitance.

67. (Withdrawn) An apparatus comprising:  
droplet ejection devices each comprising an element to change a volume of a fluid chamber of one of the droplet ejection devices, the element having an electrical capacitance; and  
control circuitry to control charging of the electrical capacitance of each of the volume changing element as a function of a frequency of droplet ejection to reduce variation in drop volume as a function of the frequency by providing respective charge voltages or charge currents to the volume changing elements.

68. (Withdrawn) The apparatus of claim 66 wherein the control circuitry controls charging of the volume changing element as a function of a frequency of droplet ejection to reduce variation in drop volume as a function of the frequency also by providing respective discharge voltages or discharge currents to the volume changing elements.

69. (Withdrawn) The apparatus of claim 67 wherein the control circuitry comprises discharging control switches to connect or disconnect discharge voltages or discharge currents to respective elements to discharge the respective electrical capacitances.

70. (Withdrawn) The apparatus of claim 66 wherein the control circuitry comprises charging control switches to connect or disconnect charge voltages or charge currents to respective elements to charge the respective electrical capacitances.

71. (New) The apparatus of claim 52 in which the volume changing element has a first terminal and a second terminal, the first terminal receives the respective charge voltage or charge current, and the second terminal is connected to electrical ground.

72. (New) The apparatus of claim 52 in which for each of some of the droplet ejection devices, the control circuitry provides the respective charge voltage or charge current by selecting a first charging resistor associated with the droplet ejection device to charge the electrical capacitance at a first rate to a first voltage, followed by unselecting the first charging resistor so that the electrical capacitance maintains the first voltage for a preset amount of time, followed by selecting a second charging resistor associated with the droplet ejection device to charge the electrical capacitance at a second rate to a second voltage before discharging the electrical capacitance.

73. (New) The apparatus of claim 52 in which each of the first charging resistor and the second charging resistor consists of two terminals.

74. (New) A method of operating droplet ejection devices each comprising an element to change a volume of a fluid chamber of one of the droplet ejection devices, the element having an electrical capacitance, each droplet ejection device being associated with a plurality of charging resistors, the method comprising:

effecting uniform velocities of droplets ejected from at least two different ones of the droplet ejection devices by providing respective charge voltages or charge currents to the volume changing elements to individually control a charge on each volume changing element; and

for each droplet ejection device, providing the respective charge voltage or charge current by selecting a first charging resistor associated with the droplet ejection device to charge the electrical capacitance at a first rate followed by selecting a second charging resistor associated with the droplet ejection device to charge the electrical capacitance at a second rate before discharging the electrical capacitance.

75. (New) The method of claim 73 wherein effecting uniform droplet velocities comprises providing respective discharge voltages or discharge currents to the volume changing elements.

76. (New) The method of claim 74 wherein providing respective discharge voltages or discharge currents to the volume changing elements comprises using discharging control switches to connect or disconnect discharge voltages or discharge currents to respective elements to discharge the respective electrical capacitances.

77. (New) The method of claim 73 wherein providing respective charge voltages or charge currents to the volume changing elements comprises using charging control switches to connect or disconnect charge voltages or charge currents to respective elements through respective charging resistors to charge the respective electrical capacitances.

78. (New) The method of claim 73 wherein selecting a first charging resistor comprises selecting a first charging resistor that consists of two terminals, and selecting a second charging resistor comprises selecting a second charging resistor that consists of two terminals.

79. (New) The method of claim 73 wherein providing a respective charge voltage or charge current to the volume changing element comprising providing a respective charge voltage or charge current to a first terminal of the volume changing element, and the method further comprises connecting a second terminal of the volume changing element to electrical ground.



80. (New) The method of claim 73, further comprising, for each of some of the droplet ejection devices, providing a respective charge voltage or charge current by selecting a first charging resistor associated with the droplet ejection device to charge the electrical capacitance at a first rate to a first voltage, followed by unselecting the first charging resistor so that the electrical capacitance maintains the first voltage for a preset amount of time, followed by selecting a second charging resistor associated with the droplet ejection device to charge the electrical capacitance at a second rate to a second voltage before discharging the electrical capacitance.